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Résumé de l'article

Cette étude montre que l'inégalité des ressources et des besoins dans une agglomération urbaine semble liée au degré de morcellement de cette agglomération. Il en ressort que le fusionnement municipal peut conduire à une distribution plus équitable des charges foncières. L'étude propose aussi une approche à l'évaluation des impacts du morcellement urbain.

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POLITICAL FRAGMENTATION AND MUNICIPAL TAX BASE RESOURCES IN THE MONTREAL METROPOLITAN AREA

by

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ABSTRACT

This paper presents the argument that in a politically fragmented agglomeration there is spatial segregation of the resources and needs related to public service provision and that this can be reduced by local government amalgamations. It also reports the findings of a study of the Montreal metropolitan area in which ways of measuring the impact of fragmentation were devised and applied. The results of this study indicate that municipal amalgamations can lead to a more equitable distribution of tax base resources.

KEY WORDS: Political fragmentation, tax base resources, service needs, Montreal.

RÉSUMÉ

I.M. BARLOW : Morcellement politique et revenu foncier dans la zone métropolitaine de Montréal

Cette étude montre que l'inégalité des ressources et des besoins dans une agglomération urbaine semble liée au degré de morcellement de cette agglomération. Il en ressort que le fusionnement municipal peut conduire à une distribution plus équitable des charges foncières. L'étude propose aussi une approche à l'évaluation des impacts du morcellement urbain.

MOTS-CLÉS : Morcellement politique, revenu foncier, services municipaux, Montréal

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The political administrative map of any large city frequently undergoes change, and that of the Montreal metropolitan area is no exception. In recent years there have been new municipalities created as the urbanized area has expanded, there have been amalgamations of existing municipalities in order to enhance local government effectiveness, and there has been the establishment of the Montreal Urban Community as a unit of metropolitan government. For the future there have been proposals for further change such as the extension of the M.U.C. beyond Montreal Island, and the amalgamation of South Shore municipalities (figure 1). Such changes and proposals are of great interest to political geographers since they involve the spatial reorganization of local government units and boundaries, and many of them can be analysed in the context of the problems associated with metropolitan political fragmentation, a politico-geographic phenomenon which is typical of the North American city.

The problems associated with this politico-geographic pattern, such as public service inefficiencies and inequities, have been frequently documented[1] and will not be enumerated here. However, it is useful to note that the governments involved in administering and servicing the Montreal area appear to be well aware of both the problems and the arguments for larger government units to overcome them[2]. However, although the problems may be alleviated by creating larger government units this might not be the most desirable strategy for change and indeed some writers have suggested that the advantages of political fragmentation outweigh the disadvantages[3]. Consequently, a major task facing those who advocate and implement change in the direction of larger units of local government is to demonstrate the benefits to be gained: this is difficult since usually there is very little substantive or conclusive evidence from which to draw. A particular aspect of this is that little is known about the extent to which the spatial reorganization of jurisdictions and boundaries reduces intermunicipal tax base differences, an element of the inequity which is seen as a major problem of highly fragmented cities. It is to this aspect of the matter that the present paper, analysing changes and proposals relating to the Montreal area, is addressed.

First consider briefly the theoretical argument relating to local government reorganization and tax base inequities. Assuming (i) that the property tax is the major source of local government revenue and (ii) that people are the main recipients of services provided by local government expenditures, then it can be argued that metropolitan political fragmentation tends to segregate resources and needs with respect to public service provision. This is beacause the industrial and commercial areas of a city are major sources of municipal revenue while the residential areas are major recipients of municipal expenditure, and when municipal boundaries are added to these spatial patterns of resources and needs the resulting compartmentalization tends to create tax-rich and tax-poor municipalities. This argument was first expounded and demonstrated by Wood in a detailed study of the New York metropolitan region (Wood, 1961).

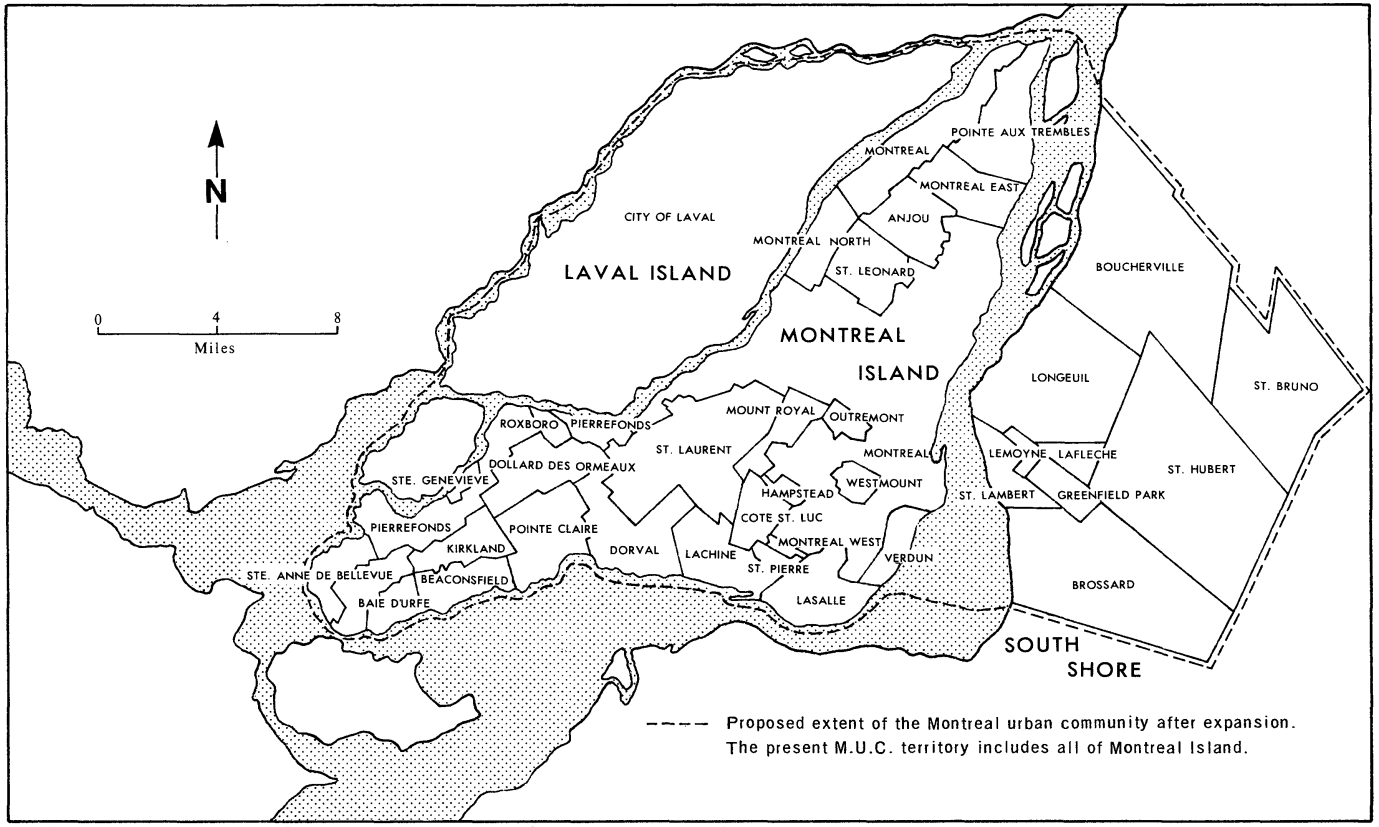
A further argument is that the amalgamation of municipalities to create larger local government units will reduce intermunicipal disparities by consolidating tax base resources. Thompson has described the effect in a different context as follows.

> "If we were to place a fine mesh grid over the urban area, we would find great disparity in income level between the cells of the land grid. As we slowly enlarged the mesh of the grid we would begin to mix neighborhoods of diverse income level, and differences in average income between cells would diminish" (Thompson, 1965, p. 270).

Although Thompson is discussing the family income characteristics of residential areas it is easy to transfer the idea to the context of local government reorganization: the 'cells' become municipalities and the 'incomes' relate to tax base resources.

Figure 1

MONTREAL AREA MUNICIPALITIES, 1971



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It is this notion of resource/need segregation and its reduction through local government amalgamations which forms the object of measurement and analysis in the rest of this paper. The discussion focusses first upon an attempt to measure the distributional patterns of resources and needs in the Montreal area at two points in time, and then introduces a number of summary measures of resource/need segregation derived from Lorenz curve analysis, examining the extent to which values for these measures are affected by both changes through time and possible future municipal amalgamations. The data analysed are drawn from 1951 and 1971 statistics[4] reflecting a twenty years' time period during which there were many changes in the pattern of local government areas. The dates also represent a period immediately preceeding the development of the M.U.C. (established in 1970) and can be regarded as a time during which the impact of political fragmentation was substantial.

INTERMUNICIPAL PATTERNS OF RESOURCES AND NEEDS

Intermunicipal variations in tax base resources and public service needs can be measured in terms of assessed property valuation and population. Although this involves simplification of a complex reality these can be regarded as adequate indicators of resources and needs in a situation such as that in the Province of Québec where the property tax is the main contributor to municipal revenues and where municipal public services are directed mainly towards the needs of citizens and households[5]. For this study resources and needs in the Montreal area were measured by two variables, assessed property valuation per developed acre and population per developed acre. The values for these variables were transformed into standard scores and these provided the basis for a resources index (R-index) and a needs index (N-index), each of which helps to locate individual municipalities in terms of distance above or below the metropolitan area means. Furthermore, these two indices allow direct comparison of the two attributes for each municipality. Values for 1971 are reproduced in Table 1 in order to give some idea of the patterns involved.

It was found that on both scales high values tend to be associated with inner city, more urbanised municipalities such as Westmount, Montreal and Verdun, whilst low values characterize peripheral, suburban municipalities such as Beaconsfield, St.Bruno, and Laval. Although both indices are based on densities which tend to decrease with distance from the city core, it should be noted that the pattern emerges quite strongly in spite of using measures based on developed areas rather than total areas, thus suggesting a parallel to the core-periphery patterns of municipal spending detected in other metropolitan areas[6].

The rank orders displayed by the sets of index values are generally similar, and statistical comparisons reveal correlation coefficients significant at the 0.01 level (for example, Spearman's $r = 0.80$ for 1971 data). However, as careful examination of Table 1 shows, there are a number of municipalities for which the differences in rank are substantial: for example, Mount Royal ranks 2 and 16, and Lemoyne ranks 15 and 3. Differences such as these suggest that although the degree of correspondence between the two variables is sufficient to be of statistical significance, the degree of correspondence in social terms leaves much to be desired, and it indicates that there are several municipalities affected by the spatial segregation of resources and needs in the Montreal area.

A further procedure was to calculate a measure of the difference between resources and needs for each municipality by recording the differences between values for the R-index and the N-index. This third measure is referred to as resources-needs-difference

Table 1

Values for the R-index and the N-index, 1971

Municipality	*R-index*	*N-index*
Westmount	+2,81 (a)*	+0,59 (7)*
Mount Royal	+1,91 (2)	−0,15 (16)
Hampstead	+1,84 (3)	+0,15 (11)
Cote St. Luc	+0,98 (7)	+0,14 (10)
St. Laurent	+0,74 (8)	+0,01 (15)
Montreal East	−0,71 (29)	−1,35 (37)
Kirkland	−0,35 (21)	−0,90 (31)
Dorval	−0,61 (26)	−1,08 (33)
Anjou	+0,51 (9)	+0,18 (9)
Pointe Claire	−0,64 (28)	−0,93 (32)
Montreal West	+0,08 (14)	−0,15 (17)
Baie d'Urfe	−1,03 (35)	−1,16 (36)
St. Leonard	+0,18 (11)	+0,07 (14)
Brossard	+0,19 (16)	−0,29 (22)
St. Lambert	−0,28 (17)	−0,34 (24)
Lachine	−0,48 (23)	−0,53 (27)
Montreal	+1,27 (5)	+1,23 (5)
Laval	−1,06 (36)	−1,10 (35)
Beaconsfield	−0,73 (30)	−0,72 (30)
St. Pierre	−0,32 (20)	−0,24 (21)
Boucherville	−0,28 (17)	−0,18 (18)
Dollard	−0,31 (19)	−0,19 (19)
Pierrefonds	−0,49 (24)	−0,35 (25)
Ste Anne de Bellevue	−1,23 (37)	−1,07 (34)
St. Bruno	−0,85 (32)	−0,65 (29)
Lasalle	+0,12 (13)	+0,32 (8)
Roxboro	−0,62 (27)	−0,31 (23)
Ste Genevieve	−0,78 (31)	−0,30 (26)
St. Hubert	−1,02 (34)	−0,62 (28)
Pointe aux Trembles	−0,45 (22)	+0,08 (13)
Longueuil	−0,53 (25)	+0,12 (12)
Greenfield Park	+0,15 (12)	+0,82 (6)
Lafleche	−0,90 (33)	−0,20 (20)
Outremont	+1,31 (4)	+2,11 (2)
Montreal North	+0,31 (10)	+1,64 (4)
Lemoyne	−0,08 (15)	+1,75 (3)
Verdun	+0,99 (6)	+3,59 (1)

* Figures in parentheses indicate ranks.

index (RND-index), and values for both 1951 and 1971 are shown in Table 2. These values reflect some of the differences between the R-index and the N-index in that the highest quartile consists mainly of municipalities from the highest quartile of the R-index whilst the lowest quartile consists mainly of municipalities from the highest quartile of the N-index. However, the main point of the RND-index is that it identifies the extreme contrasts in municipal wealth relative to needs. For example, in 1971, the differences between municipalities such as Westmount, Mount Royal and Hampstead and those such as Verdun, LeMoyne and Montreal North are considerable.

Comparisons of 1951 and 1971 RND-index values reveal evidence of both stability and change. Elements common to both years are the outstanding resource surpluses of Westmount, Mount Royal and Hampstead, and the notable deficits of Verdun, LeMoyne,

Table 2

Values for the RND-index, 1951 and 1971

1951		*1971*	
Municipality	*RND-index*	*Municipality*	*RND-index*
Westmount	+2,54	Westmount	+2,90
Outrement	+1,12	Mount Royal	+2,06
Montreal East	+0,98	Hampstead	+1,96
Hampstead	+0,73	Cote St. Luc	+0,83
Mount Royal	+0,72	St. Laurent	+0,73
Montreal West	+0,64	Montreal East	+0,64
Lachine	+0,49	Kirkland	+0,55
St. Laurent	+0,35	Dorval	+0,47
Lasalle	+0,30	Anjou	+0,73
Preville	+0,28	Pointe Claire	+0,29
Montreal	+0,24	Montreal West	+0,23
St. Lambert	+0,15	Baie d'Urfe	+0,13
St. Pierre	+0,13	St. Leonard	+0,11
Baie d'Urfe	+0,05	Brossard	+0,10
Dorval	+0,04	St. Lambert	+0,06
Pointe Claire	+0,04	Lachine	+0,05
Beaconsfield	−0,02	Montreal	+0,04
Roxboro	−0,02	Laval	+0,04
St. Michel	−0,07	Beaconsfield	−0,01
Longueuil	−0,17	St. Pierre	−0,08
Ste. Anne de Bellevue	−0,26	Boucherville	−0,10
Pointe aux Trembles	−0,30	Dollard	−0,12
Montreal North	−0,38	Pierrefonds	−0,14
Montreal South	−0,44	Ste. Anne de Bellevue	−0,16
Mackayville	−0,66	St. Bruno	−0,20
Laval des Rapides	−0,75	Lasalle	−0,20
L'Abord a Plouffe	−0,83	Roxboro	−0,31
Greenfiled Park	−0,83	Ste. Genevieve	−0,40
Jacques Cartier	−0,93	St. Hubert	−0,40
St. Leonard	−1,03	Pointe aux Trembles	−0,52
Lemoyne	−1,06	Longueuil	−0,65
Verdun	−1,44	Greenfiled Park	−0,67
Pont Viau	−1,63	Lafleche	−0,70
		Outremont	−0,80
		Montreal North	−1,33
		LeMoyne	−1,83
		Verdun	−1,60

and Montreal North. Furthermore, most of the municipalities do not appear to have greatly altered their relative positions. Notable exceptions to this are the improvements experienced by Dorval, Pointe Claire and Anjou (all rapidly growing communities), and the deterioration shown by Outremont (a municipality of relatively little growth in the 20-year period). This last example represents the most drastic change between 1951 and 1971: a resource surplus of 1.12 became a deficit of 0.80, and this resulted in a change in rank from 2 to 34.

A further use of the RND-index is that for each municipality the index indicates the amount of change which would have to occur in either the R-index or the N-index for the municipality to occupy similar positions on both indices. For example, according to the 1951 data the RND value for Westmount is + 2.54 which means that in order to have the

same values on both the R-index and the N-index the municipality's assessed property valuation per unit area would need to be reduced by 21/2 standard deviations or its population density would need to be increased by 21/2 standard deviations. This would involve a decrease in total assessed property valuation of approximately 40 million dollars, or an increase in population of approximately 35,000.

LORENZ CURVE ANALYSIS

A useful way of looking at resource/need segregation in a fragmented political-administrative system is to construct Lorenz curves in which cumulative percentages of total assessed property valuation are plotted against cumulative proportions of total population beginning with the poorest municipality in terms of assessed valuation per capita. If the two distributions are perfectly matched the plotted line will follow the diagonal, and the less well-matched they are the more the plotted line will deviate from this: the extent of the deviation is measured by the Gini coefficient which ranges from zero to one[7].

The Lorenz curve technique is particularly useful in the present study in that it provides us with a means of attaching a summary value to the distributional patterns of resources and needs. This means that it is possible to compare patterns for different points in time, and it is also possible to compare actual patterns with hypothetical patterns by using groups of municipalities as data units, the groups being defined in terms of possible future municipal amalgamations. Another useful feature of the Lorenz curve as used in this context is that an 'ideal' pattern (indicated by a Gini coefficient of zero) is possible: it represents the curve for total amalgamation, i.e.: metropolitan unification.

Gini coefficients based on 1951 and 1971 data are shown in the first part of Table 3. It should be noted that the City of Montreal was excluded from the computations because of its large size, accounting for over 50% of both population and assessed property valuation. If it had been included it would have dominated the curves and the patterns of distribution in the rest of the metropolitan area would have been obscured. This omission does not detract too much from the analysis since at each of the dates, Montreal's shares of population and assessed property valuation were almost equal, and consequently Montreal was not a significant element in the patterns of resource/need segregation.

The Gini coefficients are low, indicating that in all three years there was a high degree of matching between the patterns of resources and needs. However, it can be argued that in the context of the problem being analyzed even small coefficients are significant since any deviation from zero represents a degree of resource/need segregation which would be absent if there were a city-wide jurisdiction with taxing and spending powers.

Table 3

Computed Gini Coefficients

	Number of municipalities	*Gini Coefficient*
First set		
1951	32	0,158
1971	36	0,108
Second set		
1951	26	0,286
1971	26	0,262

Differences between the Gini coefficients suggest that during the 1951-1971 period the degree of resource/need segregation decreased: for example, the coefficient for 1971 was only 60% of that for 1951. However, any firm conclusions regarding such a trend would require more coefficients for comparison, ideally on a yearly basis.

A pertinent question at this point is: to what extent are the different coefficient values due to additions to and subtractions from the system rather than to any adjustment of the two patterns within the system? In order to answer this, a second set of Lorenz curves and Gini coefficients was computed. Again Montreal was excluded, but also municipalities which were not part of the system in either 1951 or 1971 were omitted: thus the curves were computed using data from a constant set of 26 municipalities. The results are shown in the second part of Table 3.

These Gini coefficients are considerably larger than those for the first set of curves, and there is a smaller difference between 1951 and 1971 values. These results suggest that amongst the 26 municipalities there is a higher degree of resource/need segregation than for the metropolitan area as a whole, and that the decreasing trend observed for the latter was probably due to the creation and disappearance of municipalities rather than to adjustment in the patterns of resources and needs. This would suggest that for any reduction in resource/need segregation in the future there would probably have to be structural change in the system in the form of local government reorganization.

As indicated earlier, a possible reorganization strategy is to amalgamate pairs or groups of municipalities, since it is likely that larger jurisdictions will have more heterogeneous resource/need mixes and the degree of resource/need segregation will be reduced. To test this notion a third set of Lorenz curves and Gini coefficients was computed. In this set 1971 data were used, but curves based on hypothetical structures were computed. The hypothetical structures were derived by grouping municipalities to represent amalgamated units and the curves were obtained by using the groups of municipalities rather than the actual municipalities as data units.

The groups of municipalities were based on a set of amalgamation proposals outlined in a 1973 report by the M.U.C.[8]. These proposals involve a first-stage amalgamation scheme for Montreal Island in which no municipality would be smaller than 20,000 population; and subsequent amalgamations would create a seven-city or five-city metrolitan system. The proposals relate only to the present M.U.C. territory and so for the analisis they were modified by extending the same principles of reorganization to include Laval Island and the South Shore. This resulted in five hypothetical sets of municipalities each representing a different degree of consolidation and hence a different degree of political fragmentation. These hypothetical systems are listed in Table 4 as Schemes A to E along with the number of municipalities involved in each and the computed Gini coefficients.

It can be seen that, generally, with increasing degrees of consolidation (and decreasing degrees of fragmentation) there are decreases in the value of the Gini coefficient for Scheme E is little more than half that for the 1971 system. However, the trend is not perfect, since two of the amalgamation schemes (A and E) result in increases in the value of the coefficient. Furthermore, the changes in value of the coefficient do not correspond exactly to the amount of consolidation involved in each of the schemes: the greatest decrease in value is associated with the transition from a 9-city region to a 6-city region; and the transition from a 26-city region to a 9-city region involves only a slight change in the Gini coefficient.

Table 4

Gini Coefficient for amalgamation schemes using 1971 data

*Data set**	*Number of municipalities*	*Gini Coefficient*
1971 municipalities	36	0,108
Scheme A	26	0,115
Scheme B	9	0,110
Scheme C	6	0,078
Scheme D	5	0,963
Scheme E	4	0,064

* The various amalgamation schemes are discussed in the text.

The conclusions which can be drawn from these results are that municipal amalmagamations can bring about reductions in resource/need segregation, but that for amalgagamation to be effective considerable care has to be taken over which pattern of consolidation is adopted since amalgamation in itself may not necessarily lead to improvements. With this point in mind it is interesting to note that the first-stage amalgamation proposed by the M.U.C. (Scheme A) would achieve nothing in terms of reducing the degree of resource/need segregation as measured by the Gini coefficient.

RESOURCE/NEED DIFFERENCES BETWEEN RICHEST AND POOREST MUNICIPALITIES

The data upon which Lorenz curves are based can be used to measure another aspect of the distribution of resources in relation to needs. Using the uncumulated percentages of tax base wealth and population we can calculate the proportions of each attribute accruing to the richest and poorest municipalities respectively, thus giving us a further insight into the inequities which exist. For example, the 1951 data reveals that the richest fifth of Montreal municipalities (in terms of assessed property valuation per capita) had 30.2% of the total assessed property valuation and 12.9% of the total population whilst the poorest fifth had 7.5% of the assessed property valuation and 18.3% of the population.

Similar pairs of percentages can be calculated for each intermediate fifth (or 'income group') and from the total set some idea can be gained of the degree of equity in the distribution of resources. The percentages for 1951 and 1971 are shown in the first two columns of Table 5. From these it is apparent that the proportion of total resources controlled by the richest municipalities decreased from 30.2% to 19.6% whilst the proportion associated with the poorest municipalities increased from 7.5% to 14.4%. However, this apparent change towards a more equitable distribution is partly offset by changes in the distribution of needs: the proportion of population associated with the richest municipalities decreased from 12.9% to 9.0% whilst that for the poorest increased form 19.3% to 25.9%.

A useful summary measure which can be used to identify the degree of equity in the distribution is that shown in column 4 of Table 5. This is labelled 'resource-surplus index' and represents the proportion of total resources which would have to be transferred from the rich municipalities to the poor in order to achieve an equitable distribution. This measure is in fact the D_A value discussed by Taylor (1977), or the index of dissimilarity described by Hammond and McCullogh (1974), which is sometimes used in connection with Lorenz curve analysis. It is obtained by calculating the differences between the values in

columns 1 and 2 in Table 5 and then summing the positive-signed values: the lower the final value the more equitable is the distribution of resources in terms of the amount of redistribution required to achieve a fully equitable situation. These values indicate that there was at least some increase in the degree of equity between 1951 and 1971.

The values shown in column 3 of Table 5 are also of some interest since they provide information which is obscured by the summary values. In some instances it might be important to know the breakdown of the distribution as revealed by these values: for example, it is interesting to note that in 1951 most of the 23.7% which would have to be redistributed was associated with the richest fifth of the municipalities. This kind of thing would be important knowledge in a situation in which local government reorganization is being considered as a means of reducing inequities in tax base distribution. It also identifies a limitation of the summary value, and this is that quite different patterns of distribution can have the same amount of imbalance and the same summary value. Hence it can be argued that the individual values upon which the summary value is based should be examined along with the summary value itself if an adequate evaluation is to be made regarding the nature of inequities and the need for spatial reorganization.

Table 5

Distribution of resources and needs according to 'income groups' of municipalities

	Municipality income group	*Percent of total resources*	*Percent of total needs*	*Resource/need difference*	*Resource-surplus value*
1951	1 richest fifth	30,2	12,9	+17,3	
	2	31,0	24,6	+ 6,4	
	3	11,6	11,8	− 0,2	23,7
	4	19,7	32,4	−12,7	
	5 poorest fifth	7,5	18,3	−10,8	
1961	1 richest fifth	24,0	11,9	+12,1	
	2	23,4	16,5	+ 6,9	
	3	18,3	18,3	0,0	19,0
	4	20,3	28,8	− 8,5	
	5 poorest fifth	14,0	24,5	−10,5	
1971	1 richest fifth	19,6	9,0	+10,6	
	2	22,7	16,3	+ 6,4	
	3	22,1	22,8	− 0,7	17,0
	4	21,2	26,0	− 4,8	
	5 poorest fifth	14,4	25,9	−11,5	

Resource-surplus indices were also calculated for the hypothetical structures identified earlier in order to ascertain the impact of varying degrees of political fragmentation and the effects of municipal amalgamations, and these also are shown in Table 6. The results indicate a trend towards a reduction in the resource-surplus value with each successive amalgamation stage: overall, the value decreases from 17.0 to 10.2. As is the case with the Gini coefficients for these amalgamation schemes, the greatest change in value occurs between Schemes B and C indicating a considerable difference between a 9-city region and a 6-city region. Also, there is relatively little change brought about by Scheme A indicating that the first-stage amalgamation recommended by the M.U.C. report would bring only marginal improvement.

Table 6

Resource-surplus values for amalgamation schemes using 1971 data

Data set	*Number of municipalities*	*Resource-surplus value*
1971 municipalities	36	17,0
Scheme A	26	15,7
Scheme B	9	14,8
Scheme C	6	11,6
Scheme D	5	10,5
Scheme E	4	10,2

CONCLUSION

This paper has explored the impact of political fragmentation upon the distribution of tax base resources among municipalities of the Montreal metropolitan area. It has shown that the intermunicipal patterns of resources (as measured by assessed property valuation density) and service needs (as measured by population density) though closely related are not perfectly matched thereby indicating a degree of resource/need segregation as suggested by the argument outlined at the beginning of the paper. Moreover, values for the summary measures applied to the data indicate that if the present pattern of municipalities were to be changed by amalgamations, an even closer correspondence between the two would be possible. However, the results of the analysis also indicate that amalgamation in itself does not necessarily lead to more equitable distributional patterns and that it is not simply a case of the bigger the municipalities the better the distribution. For amalgamation to be effective it would appear that great care has to be exercised in both the degree and pattern of grouping adopted. A case in point is the first-stage amalgamation proposed by the M.U.C. in which considerable reorganization and controversial change would be involved since eight municipalities would disappear from the map yet the increase in the overall equity of resource distribution would be minimal.

The summary measures used in the analysis represent an application of some already established measurement techniques to the problem under discussion, and as such can be viewed as a valuable step toward providing a basis for substantive evidence for use in the debate on metropolitan government. Particularly it should be noted that both the Gini coefficient and the resource-surplus index are meaningful in relation to the goals and objectives of local government reorganization since in both cases it can be argued that substantial changes in value in the direction of zero represent improved equity. Of course there remains the important question of how to evaluate the significance of observed value changes. This question cannot really be resolved on the basis of one study such as this and it is really necessary for several analyses to be undertaken thereby providing a basis for evaluation through comparison. However, it is useful to note two points which can be made on the basis of the present work. First, it is possible for the Gini coefficient and the resource-surplus index to have a value of zero (as would be the case for a city-wide jurisdiction with taxing and spending powers) and consequently such a value can be regarded as a measuring stick against which fragmented systems and reorganization schemes can be compared. Second, it is possible to compare changes in value through time periods in which there is no planned reorganization with changes which could result from planned change thereby evaluating the latter in relation to what might be termed "laissez-faire" or "natural" development. In the case of the Montreal area it is useful to note that the changes in index values brought about when considering the hypo-

thetical patterns are considerably greater than the differences between values which were observed for 1951 and 1971 data. This suggests that the impact of amalgamation would be greater than that of the piecemeal changes which occurred during the twenty-years' period.

Finally it should be stressed that at this stage the conclusions are tentative, and will remain so until further work is done along similar lines. In particular there is a need for similar studies of other metropolitan areas and studies covering greater time periods since it is only with the results of such studies that there can be sufficient refinement of the measures and their interpretation to provide government decision-makers and planners with a basis for demonstrating the possible benefits of any metropolitan government reorganization schemes.

NOTES

[1] In the geographical literature these problems have been discussed by Bergman (1975) and Cox (1973). Discussion in a more general vein appears in Gordon (1965).

[2] Several government reports reflect this, and major examples are: City of Montreal (1955), Montreal Urban Community (1972 and 1973), and West Island Municipalities (1972).

[3] The argument is well presented in a theoretical framework by Ostrom, Tiebout and Warren (1961).

[4] Population data were obtained from the 1951 and 1971 census, and assessed property valuation date from reports published by the Québec Bureau of Statistics. These were, *Municipal Statistics, 1951* and *Renseignements Statistiques : Municipalités du Québec, 1971.*

[5] The line of argument followed in this paper is valid only under such conditions. Where these conditions do not prevail the whole concept of resource/need segregation is questionable.

[6] For examples of this see Hawley (1951) and Kee (1965).

[7] Lorenz curves and Gini coefficients are frequently used to measure the distribution of family incomes in a population. Geographic applications are discussed by Taylor (1977).

[8] This report published the findings of a study committee investigating the current problems of the new government unit (Montreal Urban Community, 1973).

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